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Effects of the use of armaments and ammunitions containing depleted uranium

Report of the Secretary-General

Summary

The present report contains views of Member States and relevant international organizations on the effects of the use of armaments and ammunitions containing depleted uranium. The Secretary-General has, to date, received 17 reports from Governments and from the International Atomic Energy Agency and the World Health Organization.

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I. Introduction

1. The General Assembly, in paragraph 1 of its resolution 62/30, requested the Secretary-General to seek the views of Member States and relevant international organizations on the effects of the use of armaments and ammunitions containing depleted uranium, and to submit a report on the subject to the General Assembly at its sixty-third session.

2. On 15 February 2008, a note verbale was sent to Member States requesting them to submit their reports by 31 May 2008. The Office for Disarmament Affairs also submitted a request to the International Atomic Energy Agency (IAEA), the United Nations Environment Programme (UNEP) and the World Health Organization (WHO).

3. To date, the Secretary-General has received 17 replies from Governments, IAEA and WHO, which are reproduced below. Additional replies received from Member States will be issued as addenda to the present report.

4. Owing to the page limit for the report, information of a general scientific nature contained in national submissions has not been reproduced. The full texts of the submissions and additional information attached thereto are available for consultation at the Office for Disarmament Affairs.

II. Replies received from Governments

Andorra

[Original: French]
[1 March 2008]

Andorra has no army and possesses no weapons of mass destruction. The Government of Andorra condemns the use of any type of weapon of mass destruction.

Argentina

[Original: Spanish]
[1 July 2008]

1. To date, various agencies have done studies on the secondary effects of the use of armaments and ammunitions containing depleted uranium on the health of the population and on the environment. The studies describe specific scenarios in which the risk to the population could be significant, and they recommend precautionary measures in the areas in question.

2. These studies recommended more in-depth comprehensive measurements and analyses, but they were never done. Nevertheless, it is believed that the information in the studies provides a sufficient basis for questioning the continued use of such armaments and ammunitions until their secondary effects are reliably determined.

3. It is our belief that the precaution should be taken to ban further use of armaments and ammunitions containing depleted uranium as long as it is not known

how they may affect the health of the population and the environment. Once that moratorium has been established, a group of governmental experts could be convened to consider the subject comprehensively.

Austria

[Original: English]
[15 April 2008]

Austria does not possess any weapons, armaments or ammunition containing depleted uranium. With regard to the possible effects of the use of armaments and ammunitions containing depleted uranium Austria is guided by the relevant research/studies undertaken by the World Health Organization (WHO).

Belgium

[Original: French]
[6 June 2008]

1. Pursuant to the Belgian Act of 11 May 2007 prohibiting depleted uranium weapons systems, which supplemented the Weapons Act, inert munitions and armour plating containing depleted uranium or any other type of industrial uranium are now classified as proscribed weapons. The Act was published in the *Moniteur belge* of 20 June 2007 and will enter into force two years later, on 20 June 2009.

2. Parliamentary hearings with contributions by scientific experts were held before the Act was adopted. Various points of view were expressed regarding assessment of the risks to health and to the environment posed by the use of cluster munitions. The Belgian legislature in the end made a political judgement, taking into account the absence of scientific consensus on the effects of depleted uranium while also applying the precautionary principle that calls for a cautious approach in the absence of full scientific certainty.

3. Belgium will closely follow all developments in the scientific analysis of the risks associated with the use of depleted uranium weapons systems and is ready to provide the United Nations with any necessary clarification of the definitions, aims and modalities of the Belgian Act of 11 May 2007.

Bosnia and Herzegovina

[Original: English]
[24 April 2008]

Background

1. Uranium ammunition was used in the Bosnia and Herzegovina war against the forces of the Army of the Republika Srpska on 5 August 1994, and on 22 September 1994, as well as in the period from 20 August to 14 September 2005. A total of 10,800 pieces of ammunition were fired, which corresponds to approximately 2.9 tons of uranium. In 1999, the United States of America officially recognized use of this ammunition in Bosnia and Herzegovina.

2. UNEP conducted a mission in Bosnia and Herzegovina from 12 to 24 October 2002, visiting 14 locations. Of the 14 locations examined, the presence of depleted uranium in the soil was detected at 3 locations, where almost 300 points of contamination were found.

3. UNEP experts selected the locations as potential spots of activity involving ammunition with depleted uranium by the North Atlantic Treaty Organization (NATO) forces during the Bosnia and Herzegovina war, on the basis of information from the local authorities, incomplete NATO data on the places of activity and previous examinations. The results and analyses of the results obtained from the field and laboratory work were presented in the publication "Depleted uranium in Bosnia and Herzegovina: post-conflict environment assessment", issued in May 2003. The field and laboratory work found the presence of remnants of ammunition containing depleted uranium at three locations, specifically at the technical institute in Hadzici, at the Zunovnica barracks and at the artillery weapons depot in Han Pijesak. The publication also contains recommendations intended for the relevant State institutions for further action related to depleted uranium on the territory of Bosnia and Herzegovina.

4. Taking into account the administrative structure of Bosnia and Herzegovina, the official data from the competent health ministries of the Federation of Bosnia and Herzegovina and the Republika Srpska are presented separately.

Federation of Bosnia and Herzegovina

5. The Federal Civil Protection Administration made an action plan in 2003 aimed at measuring radioactive radiation and harmful waste on the territory of the Federation, which was adopted by the Government.

6. From 1 September to 6 November 2003, experts from the Public Health Institute of the Federation of Bosnia and Herzegovina, Centre for Protection against Radiation, an integral part of the Federal Civil Protection Administration took field measurements and collected samples for laboratory analysis at 37 locations in the Federation of Bosnia and Herzegovina. The results of the field and laboratory work confirmed the existence of radiological contamination at two locations only, the technical institute in Hadzici and the Zunovnica barracks. Both cases involved remnants of ammunition containing depleted uranium.

7. The field work at the technical institute in Hadzici found some 200 spots of local contamination with depleted uranium. According to the UNEP mission data, one part of the ammunition containing depleted uranium was picked up, removed and stored outside of Bosnia and Herzegovina, while the other part was stored at a temporary depot of radioactive materials in the Federation. The ammunition compiled during the fieldwork of the RHB Unit of the Federal Civil Protection Administration was stored at a temporary depot of radioactive materials in the Federation.

8. The Public Health Institute of the Federation conducted tests to measure the presence of uranium isotopes in the waters in the Hadzici area during 2004 and 2005. In 2007, a three-year project entitled "Radiological monitoring of Hadzici" was approved with a view to obtaining data on the potential presence of depleted uranium in the Hadzici area and making an assessment of the potential risk to public health.

9. Owing to the presence of depleted uranium on the territory of Hadzici municipality, and its known soil, water and air contamination potential, thus harming human health through inhaling, direct contact or ingestion, the Public Health Institute proposed that periodic screenings be performed on a sample of approximately 5 per cent of the population of Hadzici municipality in relation to the consequences of the presence of depleted uranium. A project proposal entitled "Screening of the population of the Hadzici municipality for consequences of the presence of ionizing radiation" was approved in 2007, followed by more pilot research. As the data from the regular health statistics did not indicate any increased prevalence of malignant neoplasm on the territory of Hadzici municipality, an additional examination of the medical documentation at the Hadzici health centre was conducted. After the statistical processing of the results, the expert will recommend whether a need exists for further research concerning the presence of depleted uranium and its potential threat to public health.

10. No additional action was taken in the area of the Zunovnica barracks, because the terrain is mined and access is very risky. A full identification has never been done of all locations that have been exposed to ammunition containing depleted uranium or bear remnants of such ammunition (mined terrain, bullets deep in the ground, etc.). However, the presence of depleted uranium in the environment of Bosnia and Herzegovina was confirmed beyond any doubt, and its impact on both the environment and human health, today and in the future, cannot be assessed at present except partially for the territory of Hadzici municipality.

Republika Srpska

11. The headquarters of the Republika Srpska Army submitted to the Government of the Republika Srpska the expert report from the Nuclear Science Institute of the Federal Republic of Yugoslavia on the consequences of the activity involving ammunition containing depleted uranium at the Han-Pijesak barracks.

12. In the UNEP mission research in 2002, 14 locations in Bosnia and Herzegovina were examined, while 15 were not examined due to the presence of minefields. Depleted uranium was found at the tank repair facility and ammunition depot in Hadzici and at the ammunition depot and barracks in Han-Pijesak.

13. At these locations, clear and undoubted evidence was found of radioactive bullets and contamination spots on the soil and in the ground. Water contamination was found at one of these locations, air contamination was found at two of them and contamination was found in flora samples at three locations. Depleted uranium was not found at other locations examined. As time has passed since the use of ammunition containing depleted uranium and the penetrating bullets are deep in the ground, subject to corrosion, it would be more difficult to detect or pull them out of the ground. Additionally, adequate solutions have not been found for the issue of the adequate storage of radioactive bullets or segments of soil contaminated with radioactive dust.

14. Indeed, the uranium radioactivity was significant at the time of bomb impacts, and it affected human health either by inhalation of radioactive depleted uranium dust or by staying in the environment, so that there is a high probability of the effects of chemical toxicity of the isotope U-238 as a heavy metal on specific organs, or as an alpha radiation emitter, either internal or external.

15. Since the time of the bomb impacts, the dissolution of depleted uranium isotopes and their penetration into the ground have had a negative effect on the health of the population, flora and fauna and the environment as a whole, and will continue to do so in the future.

16. An expert study on the incidence of cancer in the mortality rate in the period 1996-2000 among some 4,500-5,000 people displaced from the territory of Hadzici, who settled in Bratunac municipality in 1995, found that:

(a) The mortality rate of the population coming from Hadzici was up to four times higher than that of the local population;

(b) The mortality rate of the population from Hadzici was up to 2.5 times higher than that of all other displaced populations in the municipality;

(c) The share of cancer was significant in the total mortality rate and was significantly higher among the residents coming from Hadzici than among other groups.

17. Additionally, the International Agency for Research on Cancer, Lyon, France, states in its reports that the annual incidence of cancer cases over recent years in the Balkans and in Bosnia and Herzegovina is on the increase, growing at an average annual rate of 2 to 5 per cent.

18. Once the impact of depleted uranium on human health and the environment is properly assessed, Bosnia and Herzegovina will need to develop adequate plans, secure budget funding, train staff and equip it with the required detector equipment and a laboratory for radioisotope testing.

19. Also, further research should be conducted in the localities where weapons and ammunition containing depleted uranium were used, as well as the localities that remain to be identified and searched. Prior to this, it is necessary to secure an adequate storage place for definitive disposal of the penetration bullets, radioactive dust and contaminated soil that have been found.

20. Furthermore, periodic preventive measures and regular checks of water, soil, air, flora and fauna for the presence of depleted uranium isotopes or radiation should be conducted at the selected locations, as well as scientific research to reduce the future impact of depleted uranium on the health of the population.

Canada

[Original: English]
[10 June 2008]

The health impact of depleted uranium has been extensively studied by specialists from around the world, and no study — including those conducted by UNEP and WHO — has found any definitive link between the use of depleted uranium in operational theatres and damage to human health. Therefore, there is currently no international prohibition on the use of depleted uranium. That said, the Canadian Forces have never used depleted uranium ammunition in operations or fired such ammunition during land-based training anywhere in Canada. Depleted uranium was eliminated from the Canadian Forces' weapons inventory in 1998. Canadian policy precludes the export of uranium and depleted uranium for military

use. Canada abstained on the First Committee resolution on this matter because, absent objective research findings that indicate adverse effects of the use of depleted uranium on human health, Canada does not view a moratorium on its use as necessary at this time.

Cuba

[Original: Spanish]
[20 June 2008]

1. Cuba believes that this resolution raises a topic that needs to be discussed within the United Nations framework, in particular the General Assembly as its most participatory and democratic organ. The last word has not yet been said on the effects of the use of weapons and ammunition containing depleted uranium, and their impact on living creatures and the environment could be significant.

Some general comments on depleted uranium (DU):

2. Uranium is a chemical and radioactive element basically composed of the isotopes U-238 (98 per cent) and U-235 (0.7 per cent) and other minor isotopes. Of the two isotopes, U-235 is the most important. It is highly radioactive and is used as nuclear fuel in reactors of this type, and as an essential component of nuclear bombs.

3. In order to obtain the desired U-235, the process begins in the deposits of complete uranium (a mixture of all its isotopes) where the element is found mixed with a huge volume of minerals and rocks, from which it must be separated. Mechanical and chemical methods are used for that purpose to produce a mass of uranium which is still not usable, because the U-235 must be separated. This process is known as "enrichment" and is conducted through isotopic diffusion, after which the uranium, converted into uranium hexaflouride, is forced through a porous membrane through which U-235 molecules, but not U-238, can pass easily.

4. By repeating this process hundreds of times, the treated complete uranium separates into two parts: one in which the percentage of U-235 continues to increase in relation to the total mass, and which will be used as nuclear fuel when it reaches the 1.5 to 3.5 per cent range; and the other part, in which the U-235 continues to decline in relation to the total, which is known as depleted uranium.

5. The enrichment process produces an extraordinary volume of depleted uranium with a very low percentage of U-235 compared to U-238. Even so, when the ratios (between the two isotopes) are compared with that found in nature, where uranium is mixed with tens of hundreds of tons of extraneous material, it can be concluded that depleted uranium is very dangerous.

6. Radioactivity is the capacity of the radioactive isotopes to emit particles and rays spontaneously and uncontrollably. These particles and rays, on impact with living organisms, cause the degeneration of tissues and can lead to cancer, leukaemia and other types of effects, including genetic mutations causing children to be born with widely varying deformities.

7. The ability of radioactive substances to cause the effects described basically depends on various factors, including the following major ones: intensity of the

exposure (characteristics of the isotope in question); time of exposure (duration for which the organism is exposed) and form of exposure. Regarding the latter factor, it must be clarified that the form of exposure may be external, that is to say when the radioactive substance falls on the skin and from that moment exercises its damaging effects; or internal, when the substance is absorbed through the air being breathed or ingested with water or food, and begins to affect the organism from within.

8. It is understandable that internal exposure is hundreds of times more dangerous than external exposure, given that all rays and particles emitted by the radioactive substance affect the organism. External exposure has an effect only through rays and particles emitted in the direction of the organism.

9. Uranium, as a heavy metal, is highly toxic, and its half-life is 4.5 million years. In other words, a gram of U-235, after 4.5 million years, will be reduced to 0.5 grams; after another 4.5 million years to 0.25 grams, and so forth. One gram of radioactive uranium can cause damage for millions of years.

Depleted uranium and its use in weapons and ammunition:

10. There are several reasons for the appeal of the use of depleted uranium in weapons:

(a) As a by-product of the enrichment process mentioned before, significant quantities of depleted uranium are stockpiled. Because of its dangerous radioactivity it cannot be disposed of easily, but is stored in secure locations for an extended period of time, which can be millions of years;

(b) Depleted uranium is a dense and heavy element, capable of resisting the impact of projectiles and other materials; it is therefore used in armour plating. However, it is also capable of piercing thick armour plating and therefore is used to make projectiles whose range can be greater than conventional projectiles;

(c) Depleted uranium is an element with pyrophoric qualities, meaning that it can catch fire when exposed to temperatures over 600 degrees. This temperature can easily be reached, not only when utilizing the projectile because of the explosive charge it contains, but also through the friction the projectile undergoes with the depleted uranium when piercing armour.

11. When a projectile containing depleted uranium impacts a target, it penetrates through it, catching fire, which causes the formation of two types of particles: uranium dioxide, which is soluble in blood, and other tiny, insoluble solids that acquire the characteristics of a ceramic because of the temperatures to which they were exposed.

12. These particles spread and contaminate the air, water and food exposed to them, and through which they can be absorbed by humans and other animals.

13. The soluble particles can be eliminated relatively easily in the days, weeks and months after they enter an organism, through perspiration, urine or the blood itself. The insoluble particles remain in the organism much longer. Those under 5 microns in size which are breathed in to the lungs remain there and affect the organism for life.

14. As for the solid particles which may be ingested with water and food, some will be expelled within weeks, months or years, and others will become part of the

tissue — mainly the bones, liver and kidneys — on which they will have a lifelong effect. In addition, after the death of a contaminated person and the decomposition of the body, they will remain active, causing damage for thousands of millions of years longer. It has been calculated that 97 per cent of the depleted uranium that enters an organism remains in it until death.

15. It is well known that weapons and ammunition containing depleted uranium were used in the final years of the twentieth century, and they are suspected to have been used in this century as well. Some non-governmental organizations have reported that, during the wars in the Persian Gulf which took place at the end of the last century, thousands of soldiers were exposed to the damaging effects of depleted uranium, and since that time the effects have shown up as part of the so-called "Gulf War syndrome". The effects include chronic pain, fatigue, hair loss, memory loss, deterioration of the immune system, liver and kidney disease and diseases of other organs.

16. Some publications believe that as a result of the use of projectiles containing depleted uranium, a high quantity of particles may be dispersed over the ground, and that the majority of their effects cannot be seen in the short term.

17. To date the reports on the subject issued by international agencies cannot be termed definitive, since some remain incomplete until research and verification is conducted in the locations where weapons and ammunition containing depleted uranium were known to be used and also on the persons exposed to their impact.

18. IAEA, WHO and UNEP have produced reports giving an initial assessment of the problem. Some of these documents refer to research conducted years after the time when depleted uranium was used; nevertheless, contamination caused by that substance was discovered.

19. According to WHO studies, the most likely way civilians could have come into contact with depleted uranium is through collecting objects (bullets or spent cartridges) from the surface of the earth. Consequently, routine methods for collection of such objects from the earth's surface would be beneficial. However, it is not known whether such clearance has been conducted, and whether subsequent scientific investigations can confirm the lack of danger.

20. Likewise, the probability of depleted uranium contamination of agricultural products is unknown, and the full range of effects it could cause in groundwater remains inconclusive.

21. The research carried out advises that consideration should be given to the effects that a projectile containing depleted uranium could have if it fell to the bottom of a family's well or in a town's water collection tank. It has not been possible to check the information in this study, or at least there are no reports that anything similar has been proven. According to WHO, neither is there data in the literature on the effects of depleted uranium in still or slow-moving water.

22. Furthermore, some of the studies conducted have demonstrated that, in the case of concentrated points of contamination, someone who might come into physical contact with the soil and thereby contaminate his hands or be affected by ingesting something contaminated with depleted uranium can suffer significant contamination from the point of view of the toxicity of heavy metals. Therefore, it

would also involve ingestion of depleted uranium above the level of health standards, leading to poor kidney function or kidney failure.

23. It is difficult to predict the effect that weapons and ammunition containing depleted uranium will have when they impact a particular area and affect drinking water supply. The resulting contamination can exceed norms for such cases, including WHO standards. Local conditions, the physical and chemical properties of the weapons and ammunition containing depleted uranium and soil and groundwater conditions, among other factors, are elements that can make it difficult to determine the effects.

24. Specifically, it is probable that some munitions or other weapons containing depleted uranium are buried in the earth at a depth of several metres, and together with those which could still be on the surface, they constitute a risk of contamination of groundwater and drinking water. A high level of discharge of weapons containing depleted uranium taking place in an area can increase the potential sources of water contamination from 10 to 100 times. The radiation dose is probably very low, but the resulting concentration of depleted uranium could exceed the WHO health standards for drinking water.

25. There are also indications that some plant material, such as lichen and possibly bark, can be good environmental indicators of depleted uranium. Preliminary results must be verified by additional analysis.

26. As far as we know, international agencies in the Balkans investigated a minimal percentage of all the sites attacked with ammunition containing depleted uranium during the armed conflict in that region. On the basis of such findings it is possible to extrapolate to other sites affected by this substance. However, further investigations will be necessary to confirm the validity of those extrapolations.

27. The Member States of the United Nations are unaware of the evolution of the problems encountered by the investigations conducted by international agencies in the late 1990s of the twentieth century and the beginnings of the twenty-first. The extent of the use of depleted uranium in weapons manufacture is also not known, nor whether and where weapons and ammunition containing depleted uranium were used after the conflicts that were investigated by the IAEA, WHO, UNEP and other agencies.

28. How to address the potential damage from the use of weapons and ammunition containing depleted uranium on human beings and other living creatures and the environment must be discussed.

29. Cuba reiterates the importance of resolution 62/30, which addresses a subject of immediate concern to humanity, and hopes that the Governments of United Nations Member States and the relevant international organizations can inform the Secretary-General of their views on the effects of the utilization of weapons and ammunition containing depleted uranium, in fulfilment of the request contained in this resolution.

Finland

[Original: English]
[7 July 2008]

1. Finland shares the concerns raised in the General Assembly about the potential risk related to the use of depleted uranium in armaments and ammunitions. The issue has been the object of several international studies and it merits further political discussions worldwide.

2. Finland does not possess any ammunition containing depleted uranium.

3. The exposure of Finnish peacekeepers to depleted uranium has been scientifically examined. Analyses were made of samples taken from troops serving in Kosovo in 2000 and 2001. No indication of abnormal exposure was found. The findings were published in 2001 (see K. Lehtomäki, J. Rantanen, A. Kallio and R. Pääkkönen, "Depleted uranium: assessment of exposure of Finnish KFOR peacekeepers", *Annales Medecinae Militares Fenniae*, vol. 76, No. 2 (2001), pp. 187-192). Finland continues to closely observe any international developments in the use of depleted uranium and is ready to undertake further studies if necessary.

4. Awareness of issues related to depleted uranium is included in the training of all Finnish peacekeepers. Relevant training is planned on the basis of the risk analysis of a mission. For instance, awareness-raising and training was given to troops in preparation for the mission in Lebanon.

5. An active dialogue between civic society, non-governmental organizations, the scientific community and civil military authorities continues nationally. Finland greatly values international efforts to discuss the potential risks of the use of depleted uranium in armaments and ammunitions.

Germany

[Original: English]
[16 May 2008]

1. In the light of the public debate on the question of whether the utilization of munitions containing depleted uranium could pose risks to humans and the environment, Germany supported resolution 62/30 on the understanding that further information on and research into the effects of depleted uranium on human health and the environment might be of help to find a suitable answer on this issue.

2. With regard to the use of armaments and ammunition containing depleted uranium by armed forces, the Federal Republic of Germany wishes to inform the Secretary-General that the German Federal Armed Forces are not stockpiling and have never used armaments or deployed ammunitions containing depleted uranium.

3. In view of German participation in joint international military operations, Germany in recent years has initiated two scientific studies with a view to assessing the potential negative effects of armaments and ammunitions containing depleted uranium on human health and the environment.

4. A first study, entitled "Measurements of daily urinary uranium excretion in German peacekeeping personnel and residents of the Kosovo region to assess

potential intakes of depleted uranium", summarizes research carried out by a renowned group of experts from the National Research Centre for Environment and Health, Middlesex University, the University of Bristol, Royal Holloway University of London and the University of Milan.

5. The aim of the study was to identify potential health risks originating from depleted uranium to peacekeeping personnel in the Balkans and extended to residents of Kosovo and southern Serbia, who lived in areas where ammunitions containing depleted uranium were deployed. Analysing more than 1,300 urine samples from peacekeeping personnel serving in the Balkans, residents of Kosovo and adjacent regions of Serbia and people living in Germany (unexposed control subjects) during the period from 1999 to 2006, as well as measuring ground and tap water samples from regions where depleted uranium munitions were deployed, the study concluded that peacekeeping personnel and residents serving or living in the Balkans were not exposed to significant amounts of depleted uranium and thus no health effects related to the toxicity of incorporated uranium are expected.

6. A second experimental study, published in 2007 and entitled "Long-term corrosion and leaching of depleted uranium in soil", was conducted by researchers from the National Research Centre for Environment and Health and the Rossendorf Research Centre. The study aimed to investigate long-term corrosion and leaching of depleted uranium from ammunition buried in columns with soil cores over a period of three years.

7. The study found that the annual corrosion rate of depleted uranium munitions increased significantly during the last two years as compared to the first year and that leaching rates increased in the second and third years. It concluded that, since the large temporal and inter-column variability of leaching that had already been observed after one year was not reduced after three years, neither leaching rates measured after one year nor leaching rates obtained after three years could reasonably be used to predict leaching rates in the long term. Given the fact that a prediction of the further development of leaching is almost impossible on the basis of obtained data in the study and that the geochemical behaviour of uranium depends on a variety of factors, the study emphasizes the necessity of additional research into the transport of uranium through soil and the potential contamination of groundwater in areas affected by depleted uranium weapons if deemed necessary.

8. The result of these studies, conducted to determine the potential harmful effects of ammunitions and armaments containing depleted uranium on human health and the environment, was that significant effects could not be detected.

Japan

[Original: English]
[6 June 2008]

1. In accordance with paragraph 1 of resolution 62/30, Japan submits its views to the Secretary-General on the effects of the use of armaments and ammunitions containing depleted uranium.

2. Japan has neither owned nor used armaments or ammunitions containing depleted uranium. Japan recognizes that despite the studies conducted by relevant international organizations on the effects of the use of armaments and ammunitions

containing depleted uranium on human health and the environment, at present no internationally definitive conclusion has been drawn. Japan will continue to follow carefully the developments of the studies conducted by the relevant international organizations.

3. Japan appreciates all studies and activities conducted by international organizations, including WHO, IAEA and UNEP, related to ammunitions containing depleted uranium. Japan would like to call upon all relevant international organizations to conduct successive on-site studies and further information gathering, and to provide their views on the effects that the use of depleted uranium munitions may have on the human body and the environment.

4. In this connection, Japan pays special attention to the opinions and activities of the interested non-governmental organizations in this field. Japan intends to engage in dialogue, where appropriate, with civil society on this matter.

Mali

[Original: French]
[9 May 2008]

The Republic of Mali does not possess any arms or ammunitions containing depleted uranium.

Netherlands

[Original: English]
[10 June 2008]

1. The Netherlands voted against General Assembly resolution 62/30. The following is a response to paragraph 1 of the resolution, in which the Assembly requested the Secretary-General to seek the views of Member States and relevant international organizations on the effects of the use of armaments and ammunitions containing depleted uranium.

2. The Netherlands recognizes the need for additional research on the effects of the use of armaments and ammunitions containing depleted uranium and appreciates that this issue is being discussed in the forum of the United Nations. However, the resolution's reference to the "potential" harmful effects of the use of depleted uranium munitions on human health and the environment cannot so far be substantiated by scientific studies conducted by relevant international organizations such as WHO.

3. The Dutch armed forces do not use munitions containing depleted uranium. In the context of multinational missions, however, it is not impossible that Dutch service personnel may operate in areas in which munitions containing depleted uranium are being or have been used by allies. The health and well-being of Dutch soldiers deployed on international missions is under the continuous scrutiny of the Dutch Government. Exposure to hazardous materials must be avoided to the greatest possible extent.

Qatar

[Original: Arabic]
[8 April 2008]

1. Depleted uranium is a by-product of the uranium enrichment process, which separates natural uranium into two components. The smaller of the two contains a proportion of the fissile isotope U-235 greater than the natural proportion of 0.72 per cent. The other, larger component contains a smaller than natural proportion of U-235. This is depleted uranium. The usual isotopic makeup of depleted uranium is as follows: 99.8 per cent U-238, 0.2 per cent U-235 and 0.001 per cent U-234.

2. U-238 has a radioactive half-life of 4.5 billion years. It has metal-like qualities of high density (about twice that of lead) and high rigidity, which make it desirable for use in armour-piercing shells. It was used in the wars in the Balkans (Kosovo) and the Gulf War.

3. The health effects of depleted uranium are that it is poisonous, causing lung cancer, ovarian cancer and kidney damage. In the wake of the Gulf War the United States left behind 600,000 pounds of uranium in Iraq and Kuwait. We knew that the effects of ammunitions containing depleted uranium can reach up to 48 kilometres from a blast, and we now know the full extent of the contamination that can result. Reports indicate a 300-fold rise above normal of radiation levels in Iraq, and a 16-fold rise in cases of ovarian cancer. In other words, the biggest effects are on civilians and on the environment in the long term.

4. Therefore, the State of Qatar is in favour of banning the use of armaments and ammunitions containing uranium.

Serbia

[Original: English]
[9 June 2008]

1. The ammunitions containing depleted uranium, manufactured in various calibres and for various types of weapons and first used in the Gulf War of 1991, were also used in the NATO raids on the Federal Republic of Yugoslavia in 1999 against targets in Kosovo and Metchija, Montenegro and southern Serbia. The 30mm-calibre PGU-148 API type containing 298 grams of depleted uranium was fired from a 7-barrel gun carried on A-10 *Thunderbolt II* aircraft.

2. The major focus of the bombing campaign in which this type of weapon was used was in the areas of Prizren, Uroševac, Djakovica, Dečane and Djurakovac (Kosovo and Metohija), the municipalities of Vranje, Bujanovac and Preševo (southern Serbia) and the Luštica peninsula (Montenegro). There is a discrepancy in the number of targets quoted in the report submitted by NATO to the panel of experts on depleted uranium in Geneva in 2000 at the request of UNEP and the data available to the Serbian military: according to the latter, 85 locations were targeted in Kosovo in Metohija, 4 in southern Serbia and 1 in Montenegro.

3. The bursting of the bullet fitted with depleted uranium and the burning of a part of it upon impact on a hard surface leads to the creation of particles and

aerosols. If the impact is made at the right angle, the ensuant temperature rises to over 1,000° C accounting for the burning/oxidation of a part of uranium; at an impact on a soft surface (land) only a small fraction of the bullet is transformed into aerosols the large particles of which are deposited at the place of the impact (within the range of 100m), whereas the remainder of the bullet penetrates the surface about 1m deep. Depending on weather conditions, the small particles may be spread dozens of kilometres away, leading to radioactive contamination of large expanses of soil and atmosphere.

4. The particles are entered into the human body either by inhalation or through the consumption of food and water and are deposited in the lungs, kidneys, bones and the brains for years. Uranium is not easily solved in water and bodily fluids, but its oxides are and may over time contaminate underground waters and, through plants used as fodder and human food, animals and people.

5. In a report of the United Kingdom Atomic Energy Authority it is said, among other things, that depleted uranium will be spread over the battlefield and round hit vehicles in various quantities and particle sizes, from dust to full-size penetrators. People would be ill-advised to stay close to large quantities of depleted uranium for a protracted period of time. Obviously, it would be important to warn the population not to collect the metal and keep it at home. The report goes on to say that vehicle and soil contamination in some of the affected areas may exceed expected limits and thus present an additional risk to decontamination teams and the population.

6. Depleted uranium ammunition affects the population even after the cessation of military operations as contamination cannot be controlled and localized. It threatens the environment and may spread to adjacent countries and regions. In a report of the Vinča Institute for Nuclear Science, Belgrade, it is said that "(c)onsidering the speed and the number of rounds fired, as well as the probability of self-inflammation and the amount of radiation exceeding that of natural uranium contained in the soil many hundred-fold, it can be concluded that the use of depleted uranium ammunition leads to contamination of the environment with long-term consequences".

7. The strength of the gamma-ray dose at the contact with the bullet of the depleted uranium ammunition used in the raid against the Federal Republic of Yugoslavia in 1999 has been measured at 0.1 milliGray/hour; under the International Basic Safety Standards for Protection against Ionizing Radiation published by IAEA in 1996, the tested material belongs among radioactive material and its handling is subject to strict protection measures.

8. As radioactive waste, depleted uranium ammunition must be stored in appropriate facilities. Decontamination of contaminated locations is carried out either through excavation and removal of the soil, physical separation, a chemical separation process or at-location stabilization. There does not appear to be much experience in the world in this field today. Most often, except for at-location chemical stabilization, recourse is had to excavation whereby the entire contaminated soil is excavated and stored in appropriate facilities or only a part of it is dug up and replaced by pure earth.

9. The decontamination of locations contaminated with depleted uranium ammunition in southern Serbia has been carried out by way of physical separation.

10. The Republic of Serbia considers that the use of depleted uranium ammunition is a violation of the basic principles of international humanitarian law because:

(a) Depleted uranium is toxic and radioactive and, if taken into the human body, its particles have a long-time negative effect on human health; indeed, they may affect man throughout his life. The negative effect is noticeable in descendents, too. The use of the ammunition causes unnecessary human suffering and excessive harm disproportionate to military objectives;

(b) Spread of depleted uranium particles cannot be controlled or prevented, which affects civilian population. Depleted uranium ammunition, therefore, belongs among weapons of unselective mass destruction;

(c) Depleted uranium particles contaminate soil for thousands of years;

(d) Chemical activities of uranium oxides are a threat to the environment.

11. Accordingly:

(a) Depleted uranium ammunition is a very dangerous radioactive material with primary and secondary effects and poses a threat not only to military personnel in combat operations, but also to civilian population, flora and fauna and the environment;

(b) Use of depleted uranium ammunition accounts for permanent contamination of living creatures, material resources, edifices and the environment;

(c) Use of depleted uranium ammunition is inhuman; its military effects are disproportionate to its affliction of, and consequences for, the living world and the environment;

(d) The contaminated soil must not be left unattended and must be decontaminated, notwithstanding spiralling costs and inherent risks. Full decontamination, however, is hardly possible;

(e) Serbia has acquired considerable experience and trained personnel in carrying out the process of decontamination. The personnel may be contracted for similar assignments elsewhere;

(f) Information on the effects of depleted uranium ammunition, as well as relevant resources and expert assistance, should be made available to the affected countries;

(g) Initiative should be launched to adopt a Convention against the production and use of depleted uranium ammunition and on its destruction.

Spain

[Original: Spanish]
[29 April 2008]

Characteristics and applications of depleted uranium

1. Depleted uranium is a weakly radioactive heavy metal that is stronger than other metals, such as tungsten, and is used in ammunition.

2. In the armaments sector, depleted uranium is used to make defensive armour plate and armour-piercing ammunition, especially the coating of tank-piercing projectiles, as it is highly effective in penetrating steel.

Associated potential risks and precautionary measures

3. The handling of projectiles or ammunition containing depleted uranium does not require any special precautions besides those required for the handling of any type of conventional ammunition. The same is generally true of the dust or debris remaining after detonation.

4. Modern anti-tank projectiles combine the piercing and thermal qualities of depleted uranium, part of which, upon impact, produces an aerosol of fine particles. These particles may be inhaled, although casualties in this case are mainly due to the shock wave or heat generated upon impact, rather than particle inhalation, which would be more likely to cause harm in the long term.

5. Nonetheless, in an enclosed space, such as the interior of a combat vehicle, a cloud of slowly dispersing alpha particles could form in the absence of ventilation. Only specially trained personnel should handle debris in this case, since in addition to the potential toxicity of depleted uranium, there are also the standard hazards associated with this type of debris: the presence of explosive remnants of war, unexploded munitions, flammable or corrosive liquids, etc. It is advisable to educate troops and civilians in this regard and to clear the conflict area of any debris where security conditions allow.

Spanish study on the potential health risks associated with depleted uranium

6. In forming its opinion on this issue, the Spanish Government has drawn on the experience it accumulated in response to the expressions of national and international public concern, beginning in December 2000, over reports that military personnel of NATO who had served in the Balkans as part of various national contingents had abnormally high rates of cancer. This, in turn, was attributed to their having allegedly handled ammunition containing depleted uranium or the debris of such ammunition following detonation.

7. In light of the possibility that Spanish soldiers having participated in peacekeeping missions in the Balkans in the 1990s or currently on mission had contracted such diseases, a Scientific Committee was established to provide health-related advice to the Minister of Defence. The Committee's preliminary report, issued in March 2001, contained seven proposals for further development, including:

(a) Monitoring of the health status of military personnel having been deployed in the Balkans;

(b) Follow-up of the pre- and post-deployment medical examination protocols;

(c) Coordination with the system of periodic medical examinations regulated by the Ministry of Defence;

(d) Establishment and maintenance of a database on mission personnel (cohort);

(e) Monitoring of the cohort's health over an initially indeterminate period of time;

(f) Assignment of such monitoring tasks to a specialized body of the Military Health Department — the Institute of Preventive Medicine — and maintenance of the Scientific Committee for reference and guidance purposes;

(g) Preservation of biological samples for possible future analysis.

8. In April 2001, the plenary of Spain's Congress of Deputies agreed to carry out the seven proposals for follow-up of the situation presented by the Scientific Committee experts. It also proposed sending a report to the Defence Commission on the steps taken and results obtained following implementation of the proposals.

9. In February 2003, the first annual report was issued, including the findings of all the studies conducted thus far. The report's conclusions bore out all those of the preliminary report, to the effect that the situation presented no abnormalities. In comparison to the general Spanish population, the distribution of cancers in the sample studied was lower than expected, and no significant anomalies were identified in the study on exposure to the heavy metals analysed. The report highlighted the fact that the health surveillance systems for personnel deployed abroad, which had been strengthened in response to the concerns raised, had not detected any particular change in the area of operations that might have had an impact on the health of such personnel.

10. As a result, the Scientific Committee suggested suspending its activities while maintaining health surveillance activities through the Military Health Department.

11. The epidemiological study included 28,665 soldiers who had participated in peacekeeping operations in the Balkans between 1 January 1993 and 1 July 2001, whose health was monitored until 30 November 2002. The amount of time spent on mission ranged from 3 to 15 months, with an average of 6.5 months.

12. The monitoring was based on methods of identifying and reporting cases, using various research methods. Beginning in 2002, it was strengthened through the use of individual surveys in order to try to identify all possible cases.

13. The 40 malignancies identified within the cohort, including their distribution, histological and biological characteristics, and clinical behaviour, did not differ from those observed in standard clinical practice for the Spanish population of the same sex and age group. The results of the tests measuring heavy metal levels, including more than 31,000 tests for uranium, were within normal limits.

Spain's views on the effects of the use of armaments and ammunitions containing depleted uranium

14. Spain does not have, nor has it ever had, ammunition containing depleted uranium. The use of this material is not proscribed by any international instrument.

15. Spanish studies have not been able to demonstrate a cause-and-effect relationship between the weak radiation detected in the debris of targets attacked with depleted uranium projectiles and the development of cancer or other diseases in soldiers or civilians.

16. In addition, the numerous studies on the use of armaments containing depleted uranium in various situations, carried out by UNEP, WHO, the European

Commission and NATO, indicate that the use of depleted uranium does not pose a significant radiological risk.

17. In particular, on 6 March 2001, the European Commission's Environment Directorate-General published a report by a group of independent scientific experts commissioned to study the effects of depleted uranium. The group, made up of 35 physicians, chemists and nuclear scientists from member States, concluded that, on the basis of available information, exposure to depleted uranium could not produce detectable health effects.

18. Also in 2001, NATO established an ad hoc committee to study the effects on troops and the civilian population of the depleted uranium used in Alliance operations in the Balkans (depleted uranium was used in the 1991 Gulf War and in the 1999 Kosovo operations). The results of this study, to which institutions such as the International Committee of the Red Cross contributed, indicated that:

(a) There was no evidence of an increase in incidence of illness among peacekeepers in the Balkans compared with the incidence of illness among armed forces not serving in the Balkans;

(b) There was no evidence of a link between depleted uranium and health problems such as leukaemia or other cancers.

19. In conclusion:

(a) Depleted uranium presents little radiological risk, since its level of radioactivity is lower than the level of natural radioactivity. Depleted uranium is only a radiological hazard when, in its pure form, it remains in contact with the skin for an extended period of time;

(b) According to current research, the only possible health risk is the use of a heavy metal such as lead or depleted uranium, which, in certain circumstances, can have harmful effects on the liver and kidneys. An individual must be nearby at the time of impact and must absorb a large quantity of depleted uranium dust in order to be negatively affected by such risks.

III. Replies received from agencies and organs of the United Nations system

International Atomic Energy Agency

[Original: English]
[3 June 2008]

The IAEA assessment of radiological consequences of depleted uranium residues contamination in post-conflict situations

1. In the recent past, the use of depleted uranium in conventional anti-tank munitions during conflicts in the Balkans and the Middle East resulted in the contamination of these territories with radioactive residues.

2. Depleted uranium is one of the by-products of uranium enrichment and, like any other uranium compound, has both chemical and radiological toxicity. Depleted uranium is only slightly radioactive, 60 per cent as radioactive as natural uranium.

Depleted uranium has the same chemical and physical properties as natural uranium. The chemical toxicity of uranium is normally the dominant factor for human health. However, in special circumstances in which depleted uranium was inhaled or ingested or where fragments came into close contact with individuals, it is necessary to also assess its radiological impact.

3. After the above-mentioned conflicts, questions arose regarding the possible consequences of the existence of depleted uranium residues for local populations and the environment. As part of the United Nations system's effort to respond to the requests of affected States to assess the consequences of the use of depleted uranium ammunitions in conflict situations, IAEA — with its unique statutory functions, i.e., to establish standards of safety for protection against radiation exposure and to provide for the application of these standards — has been involved in coordinated evaluation exercises.

4. A number of evaluation of the environmental and health impact of depleted uranium munitions have been performed by national and international organizations. IAEA participated together with UNEP and WHO in several international appraisals like those in Bosnia and Herzegovina, Serbia and Montenegro, Kosovo, Kuwait, Iraq and Lebanon. The radiological framework for these studies was the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (Safety Series No. 115, IAEA, Vienna, 1996) and the methodology was generally based on sampling campaigns, analysis of the environmental samples in recognized international laboratories and radiological assessments performed by international experts.

5. The objectives of these assessments have been to draw conclusions regarding the toxic and radiological safety and to make recommendations to mitigate the hazards to the population and the environment, on the basis of comprehensive surveys at specific locations where depleted uranium ammunition residues may have been spread. These studies exclusively dealt with civilian inhabitants and environment radiological risk in areas affected by military actions after the conflicts were terminated. The results and conclusions are valid at the time of the assessments and, when possible and under certain grounds, prospectively, IAEA did not evaluate the impact of depleted uranium ammunition on the troops or the populations at the time of the conflicts.

6. In general, the results of these assessments indicated that the existence of depleted uranium residues dispersed in the environment does not pose a radiological hazard to the population of the affected regions. Estimated annual radiation doses that could arise from exposure to depleted uranium residues would be very low and of little radiological concern. Annual radiation doses in the areas where residues do exist would be of the order of a few microsieverts, well below the annual doses received by the population from the natural sources of radiation in the environment and far below the reference level recommended by IAEA as a radiological criterion to help establish whether remedial actions are necessary.

7. Complete depleted uranium ammunition or fragments can still be found at some locations where depleted uranium weapons were used during past wars. Prolonged skin contact with these depleted uranium residues is the only possible exposure pathway that could result in exposures of radiological significance. As long as access to the areas where these fragments exist remains restricted, the likelihood that members of the public could come into contact with these residues is

low. The recommendations to the national authorities, in all the cases studied were to collect any depleted uranium ammunition or fragments and any war equipment which have been in direct contact with these ammunitions and isolate them from the public in appropriate locations until it can be processed as low level radioactive waste and eventually safely disposed of. Some environmental remedial actions like covering of areas with uncontaminated soils could be convenient at some particular locations, depending on the use of the land.

8. After the conclusion of the investigations in which IAEA participated, the national authorities in the affected regions should have had the competence and equipment to carry out the necessary monitoring, survey and remedial activities in relation to depleted uranium. This was actually observed in all the cases studied.

9. IAEA together with UNEP and WHO provided coordinated response to the request of its Member States to assess the post-conflict radiological risk to the public and the environment from the contamination of territories with depleted uranium residues. IAEA generally concluded that the radiological risk was not significant and could be controlled with simple countermeasures conducted by national authorities. It was also observed that in a post-conflict environment where the social and economic disruption is high, the radiation fear linked to the presence of depleted uranium residues further increases the anxiety of the population. In many of the concerned countries the results of the radiological evaluations provided a basis for public reassurance due to the low significance of the radiological impact.

World Health Organization

[Original: English]
[2 June 2008]

Background

1. The main civilian uses of depleted uranium include counterweights in aircraft, radiation shields in medical radiation therapy machines and containers for the transport of radioactive materials. The military uses of depleted uranium for defensive armour plate is based on its high density as well as ability to ignite on impact if the temperature exceeds 600° C.

2. Earlier reports of the international organization (IAEA, UNEP and WHO) focused on environmental and health impact of depleted uranium for example in Bosnia and Kuwait. Depleted uranium concentration levels in soil exceeding background levels of uranium was reported close to locations of depleted uranium shrapnel or remains of tanks left after military operations. Over time, the depleted uranium concentration is dispersed into the wider natural environment by wind and rain. People living or working in affected areas may inhale re-suspended contaminated dusts.

Potential health effects of exposure to depleted uranium

3. Average annual normal intake of uranium by an adult is estimated to be about 500 µg from ingestion of food and water and 0.6 µg from inhaling air. Ingestion of small amounts of depleted uranium-contaminated soil by small children may occur while playing in post-conflict zones. Occasional exposure of depleted uranium through the skin contact does not result in any ascertainable health effect.

4. Because depleted uranium is only weakly radioactive, chemical toxicity is the prevailing concern. The kidneys are the main site of potential damage from chemical toxicity of uranium. Limited information from human studies indicates that the severity of effects on kidney function and the time taken for kidney function to return to normal both increase with the level of uranium exposure.

5. To date, no consistent evidence of adverse effects of depleted uranium has been reported for the skeleton or liver. No reproductive or developmental effects have been reported in humans. Long-term follow-up studies on military personnel wounded during military operations and living with depleted uranium-containing fragments embedded in soft tissue show elevated level of depleted uranium in urine. Although uranium released from embedded fragments may accumulate in the central nervous system tissue, and some animal and human studies are suggestive of effects on central nervous system function, it is difficult to draw firm conclusions from the few studies reported.

6. In 2001, WHO produced the report "*Depleted uranium: sources, exposure and health effects*", which will be updated in 2008. New evidence from recent epidemiological and experimental studies will be reviewed, however, no major deviation from previous conclusions is expected.

Monitoring and treatment of exposed individuals

7. For the general population, neither civilian nor military use of depleted uranium is likely to produce radiation doses significantly above normal background levels. Therefore, individual exposure assessments for depleted uranium will normally not be required. Exposure assessments based on environmental measurements may be useful for monitoring and the information and reassurance of the public.

8. When an individual is suspected of having been exposed to depleted uranium at a level of dose significantly above the normal background level, an assessment of depleted uranium exposure and kidney function may be required. This is best achieved by analysis of daily urine excretion.

9. In conjunction with the United Nations Joint Medical Service, WHO has developed guidance on exposure to depleted uranium for medical officers and for programme administrators. These recommendations provide advice on the need for special medical examinations or monitoring the health of populations living in conflict areas with possibly significant exposure to depleted uranium (see www.who.int/ionizing_radiation/en/Recommend_Med_Officers_final.pdf).

Recommendations

10. Following military conflicts, levels of depleted uranium concentration in soil and air might be detected in affected areas even after a few years. The area contaminated with armour, tanks, shrapnel, etc. should be monitored. Where justified and possible, clean-up operations in impact zones should be undertaken if there are substantial numbers of radioactive projectiles remaining and where qualified experts deem contamination levels to be unacceptable. If high concentrations of depleted uranium dust or metal fragments are present, then areas may need to be cordoned off until removal can be accomplished. Such impact sites are likely to contain a variety of hazardous materials, in particular unexploded

ordnance. Due consideration needs to be given to all hazards, and the potential hazard from depleted uranium kept in perspective. In general, disposal of depleted uranium should follow appropriate national or international recommendations.

11. Particular emphasis should be placed on the protection of children. Small children could receive greater exposure to depleted uranium when playing in or near depleted uranium impact sites. Their typical hand-to-mouth activity could lead to high depleted uranium ingestion from contaminated soil.

12. Risk communication campaigns may be needed in the affected areas to educate local populations on potential hazards and risks for their health. This is especially important in areas where scrap metal is collected and melted for sale. This may impose a significant risk to health of people and especially children due to the inhalation of toxic vapours resulting from metal melting. National authorities for the affected post-conflict zones should be advised to take action to control and regulate such activities in local communities.